

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims 1-2 (canceled)

Claim 3 (currently amended): ~~The system of claim 2, wherein the multiple beam optical array transceiver comprises:~~ A system for providing real-time image control and processing for use in wide area space based surveillance utilizing an Optical Tera-bps Satellite (OPTSAT) network, including a plurality of OPTSATs, the system comprising:

at least one surveillance aperture, on-board one of the plurality of OPTSATs, for optically imaging an object, wherein the surveillance aperture on-board the OPTSAT receives an optical signal representative of an optical image of the object;

at least one image processor for processing the optical image obtained by the at least one surveillance aperture; and

at least one terminal capable of wirelessly transceiving information between the at least one terminal and the at least one of the plurality of OPTSATs, the at least one terminal includes a display for displaying the optical image,

wherein the at least one surveillance aperture is connected to a multiple beam optical array transceiver comprising:

at least one receive amplifier for amplifying received optical signals;

at least one micro-electronic mechanical (MEM) mirror for reflecting free-space optical signals;

at least one bi-directional optical coupler connected to the receive amplifier, and associated with the MEM mirror, for receiving from the connected amplifier an optical signal, and reflecting a free-space optical signal onto and receiving a reflected free-space optical signal from the associated MEM mirror; and

a controller for controlling the aiming of the MEM mirror.

Claim 4 (previously presented): A system for providing real-time image control and processing for use in wide area space based surveillance utilizing an Optical Tera-bps Satellite (OPTSAT) network, including a plurality of OPTSATs, the system comprising:

- at least one surveillance aperture, on-board one of the plurality of OPTSATs, for optically imaging an object, wherein the surveillance aperture on-board the OPTSAT receives an optical signal representative of an optical image of the object, wherein the at least one surveillance aperture includes a multiple beam optical array transceiver, comprising:
  - at least one receive amplifier for amplifying received optical signals;
  - at least one micro-electronic mechanical (MEM) mirror for reflecting free-space optical signals;
  - at least one bi-directional optical coupler connected to the receive amplifier, and associated with the MEM mirror, for receiving from the connected amplifier an optical signal, and reflecting a free-space optical signal onto and receiving a reflected free-space optical signal from the associated MEM mirror; and
  - a controller for controlling the aiming of the MEM mirror;
- at least one image processor for processing the optical image obtained by the at least one surveillance aperture; and
- at least one terminal capable of wirelessly transceiving information between the at least one terminal and the at least one of the plurality of OPTSATs, the at least one terminal including a display for displaying the optical image; and

wherein the system further comprises at least one transmit amplifier for amplifying optical signals prior to transmission when utilizing a LADAR on-board the OPTSAT.

Claim 5 (currently amended): ~~The system of Claim 2, wherein the multiple beam optical imaging sensor array transceiver comprises:~~ A system for providing real-time image control and processing for use in wide area space based surveillance utilizing an Optical Tera-bps Satellite (OPTSAT) network, including a plurality of OPTSATs, the system comprising:

- at least one surveillance aperture, on-board one of the plurality of OPTSATs, for optically imaging an object, wherein the surveillance aperture on-board the OPTSAT receives an optical signal representative of an optical image of the object;

at least one image processor for processing the optical image obtained by the at least one surveillance aperture; and

at least one terminal capable of wirelessly transceiving information between the at least one terminal and the at least one of the plurality of OPTSATs, the at least one terminal includes a display for displaying the optical image,

wherein the at least one surveillance aperture is connected to a multiple beam optical array transceiver comprising:

- at least one receive amplifier for amplifying received optical signals;
- at least one bi-directional optical switch bank having a bi-directional fiber optic input and a plurality of bi-directional fiber optic outputs;
- at least one bi-directional optical coupler connected to the receive amplifier, and having a bi-directional port for communicating with the input of the switch bank;
- and
- a controller for controlling the switch bank.

Claim 6 (previously presented): A system for providing real-time image control and processing for use in wide area space based surveillance utilizing an Optical Tera-bps Satellite (OPTSAT) network, including a plurality of OPTSATs, the system comprising:

at least one surveillance aperture, on-board one of the plurality of OPTSATs, for optically imaging an object, wherein the surveillance aperture on-board the OPTSAT receives an optical signal representative of an optical image of the object, wherein the at least one surveillance aperture includes a multiple beam optical array transceiver, comprising:

- at least one receive amplifier for amplifying received optical signals;
- at least one bi-directional optical switch bank having a bi-directional fiber optic input and a plurality of bi-directional fiber optic outputs;
- at least one bi-directional optical coupler connected to the receive amplifier, and having a bi-directional port for communicating with the input of the switch bank;
- and
- a controller for controlling the switch bank;

wherein the system further comprises at least one transmit amplifier for amplifying optical signals prior to transmission when utilizing a LADAR on-board the OPTSAT.

**Claim 7 (previously presented):** A system for providing real-time image control and processing for use in wide area space based surveillance utilizing an Optical Tera-bps Satellite (OPTSAT) network, including a plurality of OPTSATS, the system comprising:

at least one surveillance aperture on-board at least one of the plurality of OPTSATS for imaging an object, the at least one surveillance aperture including a multiple beam optical array transceiver, comprising:

at least one receive amplifier for amplifying received optical signals;

at least one bi-directional optical switch bank having a bi-directional fiber optic input and a plurality of bi-directional fiber optic outputs;

at least one bi-directional optical coupler connected to the receive amplifier, and having a bi-directional port for communicating with the input of the switch bank; and

a controller for controlling the switch bank,

wherein the switch bank comprises a plurality of optical switches connected in a binary branch configuration between the input and the plurality of outputs of the switch bank for at least one of

receiving an optical signal at the input of the switch bank and controlling a transmission direction of the free-space optical signals through the surveillance aperture by directing the optical signal to one of the plurality of outputs according to the switching of the optical switches, and

receiving a free-space optical signal at one of the output ports of the switch bank by controlling the receiving direction of the multiple beam optical array transceiver according to the switching of the optical switches.

**Claim 8 (original):** The system of Claim 1, wherein the at least one image processor is included in at least one of the plurality of OPTSATS.

**Claim 9 (original):** The system of Claim 1, wherein the at least one image processor is located in a ground based image processing center.

**Claim 10 (original):** The system of Claim 1, wherein the at least one image processor is included in the at least one terminal.

**Claim 11-22 (canceled)**

**Claim 23 (previously presented):** The system of claim 1, wherein:

- the image processor is a terrestrial or airborne image processor;
- the at least one OPTSAT includes a converter configured to convert the received optical signal representing the optical image to an optical wavelength suitable for optical fiber transmission; and
- the OPTSAT down-links the optical wavelength to the terrestrial or airborne image processor.

**Claim 24 (previously presented):** The system of claim 7, wherein the system further comprises at least one transmit amplifier for amplifying optical signals prior to transmission when utilizing a LADAR on-board the OPTSAT

**Claim 25 (previously presented):** A system for optically imaging one or more terrestrial-based or airborne objects, comprising:

- a laser radar (LADAR) equipped optical satellite, comprising:
  - an optical aperture for transceiving free-space optical signals; and
  - a multiple beam optical array transceiver, comprising:
    - an optical beam steering controller configured to issue optical beam steering commands;
    - an optical amplifier bank including transmit amplifiers and receive amplifiers;

an optical beam steering mechanism optically coupled between the optical amplifier bank and the optical aperture, including beam steering components that are configured, responsive to the beam steering commands, to

(i) receive optical signals from the transmit amplifiers, and direct the optical signals through the optical aperture in desired directions toward the one or more objects in order to image the one or more objects, and

(ii) receive optical signals through the aperture from the desired directions corresponding to the one or more objects, and pass the received optical signals to the receive amplifiers, wherein the received optical signals represent optical images of the one or more objects; and

a converter configured to convert the received optical signals representing the optical images to an optical wavelength suitable for optical fiber transmission,

wherein the multiple beam optical array transceiver and optical aperture are configured to down-link the optical wavelength; and

a terrestrial-based or airborne terminal configured to receive the down-linked optical wavelength, recover the optical images of the one or more objects from the optical wavelength, and including a display to display the recovered optical images.

Claim 26 (previously presented): The system of claim 25, wherein the beam steering components comprise an optical switch bank including bidirectional optical switches that branch from a base node of the switch bank that is optically coupled to the amplifier bank to terminal nodes of the switch bank that are optically coupled to the optical aperture, the optical switches configured to

receive an optical signal at the base node of the switch bank and control a transmission direction of the optical signal through the optical aperture as a free-space optical signal by directing the optical signal to one of the terminal nodes according to the switching of the optical switches responsive to the optical beam steering commands, and

control a direction from which a free-space optical signal is received through the optical aperture by directing the received free-space optical signal from a selected one of the terminal nodes to the base node according to the switching of the optical switches responsive to the optical beam steering commands.

Claim 27 (new): The system of Claim 5, wherein the at least one image processor is included in at least one of the plurality of OPTSATs.

Claim 28 (new): The system of Claim 5, wherein the at least one image processor is located in a ground based image processing center.

Claim 29 (new): The system of Claim 5, wherein the at least one image processor is included in the at least one terminal.

Claim 30 (new): The system of claim 5, wherein:

- the image processor is a terrestrial or airborne image processor;
- the at least one OPTSAT includes a converter configured to convert the received optical signal representing the optical image to an optical wavelength suitable for optical fiber transmission; and
- the OPTSAT down-links the optical wavelength to the terrestrial or airborne image processor.